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**Light Battalion Task Force Reconnaissance
and Surveillance: Clear Vision or Groping
In The Dark?**

**A Monograph
by**

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ABSTRACT

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This monograph examines the light infantry battalion task force in an effort to determine whether it is capable, as currently configured, of conducting effective reconnaissance and surveillance operations.

The monograph first explores the theoretical aspects of reconnaissance and surveillance (R&S). The writings of Sun Tzu, Frederick the Great, Jomini, Clausewitz, and Guderian are reviewed to distill some fundamental truths about R&S. Next, two historical perspectives are offered. Operations of the 173d Airborne Brigade (Separate) in Vietnam and the 82d in Grenada are studied to assess how they conducted reconnaissance and surveillance operations.

With this background, the paper then examines the performance of today's light infantry battalion R&S system. This portion of the paper is drawn in large measure from analysis of Joint Readiness Training Center take home packages. The study concludes that if the light task force commander doctrinally employs all of his assets, he has the ability to effectively recon and surveil the battlefield. However, today gaps exist between the R&S coverage task force commanders can have, and what they routinely get. This delta is most frequently the result of: poor IPB, ineffective use of PIRs, flawed surveillance plans, and inaccurate or untimely reporting.



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INTRODUCTION

I have spent all my life trying to guess what lay on the other side of the hill.

The Duke of Wellington¹

Nearly 200 years have passed since the Duke of Wellington pondered what lay over the next hill, yet his timeless question remains applicable for today's light infantry task force. To preclude surprise and effectively focus his combat power, the commander must know the enemy's disposition, composition, and likely course of action. When effectively resourced and conducted, reconnaissance and surveillance can answer these questions for the commander. Is today's light battalion task force capable of conducting effective reconnaissance and surveillance operations?

Before exploring the answer to this question, we must frame the problem by identifying: the light battalion capabilities, some key definitions, the criteria for analysis, the significance of the issue, and the methodology for evaluating the data. Armed with this foundation, we will examine two historical case studies and then the current light infantry battalion.

The Army's light infantry divisions were developed to "be able to fight---anytime, anywhere, and against any opponent."² However, the capability of the division's nine infantry battalions is optimized against light enemy forces or against heavy forces

operating in close terrain. The light infantry battalions, organized into three rifle companies and a headquarters company, are comprised primarily of "foot mobile fighters with lightweight weapons systems."³

The battalion is capable of conducting the full range of infantry missions, in all types of terrain and climatic conditions, against enemy light forces...or against enemy heavy forces in close terrain...⁴

Two critical capabilities required to successfully execute most of these infantry missions are reconnaissance and surveillance operations. Reconnaissance is an active mission undertaken to obtain information about the enemy, weather and terrain.⁵ It is normally "directed toward one or more specific targets without a requirement for continuous coverage."⁶ Conversely, surveillance missions are passive in nature and provide systematic area coverage from a static, concealed position.⁷

To determine whether the light battalion task force can effectively conduct reconnaissance and surveillance operations, I will specifically define my criteria for "effect reconnaissance and surveillance". Throughout this paper, effective reconnaissance and surveillance will require five components: 1. thorough intelligence preparation of the battlefield (IPB), 2. appropriate priority intelligence requirement (PIR) selection, 3. effective reconnaissance and surveillance planning, 4. efficient asset employment, and 5. efficient processing and dissemination of collected information. (These criteria are explained fully at appendix A. A brief review of this appendix will enhance your

understanding of the analytical criteria applied to structure the remainder of the paper.)

Why are reconnaissance and surveillance important?

Clausewitz describes the battlefield as a complex environment shaped by chance, fog, and friction.⁸ In spite of these factors, the commander still must make rapid decisions. An effective reconnaissance and surveillance effort will reduce the fog, mitigate friction, and decrease the percentage that chance plays in an operation.

Expressed more succinctly, "knowledge is power on the battlefield ... because leaders can only influence the battle when they have timely accurate information."⁹ The respected Rand report on reconnaissance notes that it should be viewed as a combat multiplier. And that "experienced battalion commanders have claimed that good reconnaissance is worth two extra company teams to the task force."¹⁰ This report also develops an irrefutable, empirical link showing a strong correlation between good reconnaissance and successful battle outcome.

Although reconnaissance and surveillance are essential for all units, they are most critical for light units because of their limited mobility and fire power. As General Wickham states, "Light Infantry will be able to seek out and destroy the enemy using initiative, stealth and surprise. Attacks by infiltration, air assault, ambush, and raid will be the norm."¹¹ These types of employment, mandate timely accurate intelligence, the bulk of which is normally generated by aggressive reconnaissance and

surveillance.

Similarly, the light infantry's limited mobility creates a greatly reduced reaction time, which in turn requires more precise reconnaissance and surveillance to generate operational flexibility. Thus, where a heavy task force has a 15 kilometer area of interest forward of the FLOT, the light task force has a 50 kilometer area of interest, to afford it additional reaction time."

While the criticality of effective reconnaissance and surveillance operations to the light infantry task force is clear, comments from the JRTC reveal that they tend to be areas fraught with habitual shortcomings. Therefore, we will investigate the subject to determine if the light battalion task force is capable of conducting effective reconnaissance and surveillance operations. We will begin with a review of some classic theoreticians' thoughts on the subject, which will in large measure validate our doctrinally derived criteria. Next we will use five criteria: thorough IPB, appropriate PIR selection, effective R&S planning, efficient asset employment, and efficient processing and dissemination of collected information to analyze reconnaissance and surveillance operations of the 173d Airborne Brigade (Separate) in Vietnam and the 82d Airborne Division in Grenada. Finally, we will use our criteria to examine current reconnaissance and surveillance operations of the light battalion task force. This last analysis will be developed from JRTC derived data. It will lead us (a.) to conclusions about current

reconnaissance and surveillance, and (b.) to implications for the future.

THEORETICAL INSIGHTS ON RECONNAISSANCE AND SURVEILLANCE

Know the enemy, know ourself; your victory will never be endangered. Know the ground, know the weather, your victory will then be total.

Sun Tzu³

The fundamental importance of sound reconnaissance and surveillance is not new to the art of war. Commanders have always sought information on the enemy, weather and the terrain. One of the first warriors to write about this was Sun Tzu.

Although Sun Tzu did not refer to it as IPB, he appears to have been a master of analysis and integration of data on the enemy, weather and terrain. He begins The Art of War discussing five fundamental factors which must be studied prior to embarking on war. Notably, these include analysis of the weather and the terrain. In all, Sun Tzu devotes about twenty percent of his book to two chapters describing the effects of terrain on military operations and classifying ground into nine varieties. To maximize the many advantages offered by the terrain, the commander is urged to "thoroughly acquaint himself beforehand with the maps" and to store all these facts "in his mind"....⁴ Additionally, his interest in identifying "critical points on strategic roads" can be equated to the selection of named areas of interest (NAIs) in current IPB doctrine.

Sun Tzu also describes a very analytical process by which data developed on the enemy, weather, and terrain are quantified

and studied.

...calculations are made respecting the degree of difficulty of the enemy's land; the directness and deviousness of its roads; the number of his troops; the quantity of his war equipment and the state of his morale. Calculations are made to see if the enemy can be attacked...

This methodical analysis appears to parallel our current IPB.

Like Sun Tzu, Jomini stresses the importance of understanding the terrain, one is to fight on as well as knowing one's enemy. He suggests that a commander should have "the most thorough knowledge possible of the elements of power and of the military resources of the enemy" and of the "topographical and strategic description of the theater of war."⁵ Ideally, Jomini believes that the commander will accurately evaluate all of this available data and correctly determine the "decisive and objective points", based on his understanding of the enemy forces and the terrain."

Jomini's clear appreciation of reconnaissance derived information is evidenced by recommending that the best way to form good sound tactical plans is "to order movements only after obtaining perfect information of the enemy's proceedings."⁶ Jomini does not address the mechanics of how to collect this "perfect information", but he does admit that the pursuit of it is more of a theoretical objective than an anticipated reality; "...it is a thing of the utmost difficulty, not to say impossibility..."⁷

Knowledge of the battlefield was also foundational to Frederick the Great. He implored his officers to examine and re-

examine frequently "the most detailed and exact maps of the country that can be found."²⁰ To round out this terrain analysis effort, he encouraged examination [reconnaissance] of "the foot paths, the depths of the woods, their nature, the depth of the rivers [and] the marshes that can be crossed..."²¹ "He believed that the commander who does not know the country will do nothing but make gross mistakes...."²²

Our present day IPB process clearly differs in specific techniques from these classic theoreticians. Nonetheless, the essence of IPB's objective, to provide the commander with accurate information on the enemy and the terrain by way of a thorough disciplined thought process, is unmistakably reflected in their writings.

However, not reflected in their works are references to our second and third criteria - appropriate selection of priority intelligence requirements and effective reconnaissance and surveillance planning. History suggests that successful military commanders included some form of both processes in employing their reconnaissance and surveillance assets. Current doctrine validates these criteria. (See appendix A)

Theoreticians do, however, comment on the efficient employment of reconnaissance assets, our fourth criteria. Sun Tzu recommends orientating on a reconnaissance objective using local guides...to "obtain the advantages of the ground" such as "critical points on his [the enemy's] strategic roads."²³ He further recommends probing the enemy to "learn where his strength

is abundant and where deficient."²⁴ and employing secret agents and scouts to "listen" and "see clearly"²⁵ Finally, he cautions that the reconnaissance effort must be conducted with stealth by relying on concealment.²⁶

Like Sun Tzu, Clausewitz realized the reconnaissance value provided by advanced guards and outposts "to detect and reconnoiter the enemy approach before the [the enemy] comes into view."²⁷ He stated that the advanced guard's objective is to "make the enemy disclose his dispositions and intentions prematurely, thereby "substantially increasing observations"²⁸

Although Clausewitz acknowledges the importance of these reconnaissance and surveillance efforts, throughout On War he remains highly suspicious of the information they produce. Noting that the "reports are always a little out of date," timeliness remains one of his major points of concern.²⁹

As did Clausewitz, Frederick directed the use of reconnaissance to provide information on the enemy. When encamped, employ "eight or ten patrols...on all sides around the camp so that we may be warned of what is happening."³⁰ Likewise, when attacking "reconnoiter thoroughly the roads by which it [the objective] can be reached...have guides conduct the column."³¹

Unlike the preceding theoreticians, Guderian's writings, on reconnaissance in The Infantry Journal, focused primarily on fundamental tactical principles for the effective employment of reconnaissance and surveillance assets. He believed that reconnaissance requires "highly mobile, flexible and easily

handled units that possess a wide radius of action and good means of communication."³² For a reconnaissance unit to demonstrate such attributes he felt it imperative for the unit to train in its war time configuration and for them to develop and maintain "expert map reading" skills.³³

When employed, General Guderian stressed that a reconnaissance unit generally avoids contact and uses concealment in order to maximize its primary mission of observation and reporting. However, if observed and engaged by enemy reconnaissance forces, it should be "capable of defeating any similar opponent."³⁴ Lastly, he clearly recognized that for a reconnaissance mission to be of utility, the commander must receive information in sufficient time to take action on it.³⁵

Even when information is timely, it does not become intelligence until it is processed. Only one of our theoreticians, Clausewitz, comments on our last criteria, efficiently processing and disseminating collected information. He notes that "many intelligence reports in war are contradictory; even more are false and most are uncertain."³⁶ Combat creates fear which serves to "multiply lies and inaccuracies" further complicating the uncertainties inherent in reconnaissance collected data.³⁷ Clausewitz stressed the challenges of accurate analysis when he said, "Bonaparte was quite right when he said that Newton himself would quail before the algebraic problems it could pose."³⁸ To avoid disseminating or acting on unsubstantiated information in this environment of uncertainty, he cautions the

commander to "be guided by the laws of probability" and to "trust his judgment".³⁹

This examination of five respected theorists' writings on reconnaissance and surveillance, highlights several fundamental truths. First, knowledge of the terrain and enemy dispositions remains the cornerstone of military operations. Second, commanders must make effective use of scouts and patrols to stealthfully collect critical information on the enemy. And last, accurate processing of information collected by reconnaissance and surveillance assets is difficult because of fog of battle and the timeliness of reports.

The theoretical concepts discussed in this chapter will be further substantiated as we examine two recent historical examples of U.S. infantry conducting reconnaissance and surveillance operations. We will then be able to see that theory, history, and doctrine combine to validate the criteria we will to assess the reconnaissance and surveillance capability of today's light infantry battalion.

173d AIRBORNE BRIGADE OPERATIONS IN VIETNAM '65-'68

The 173d Airborne Brigade (Separate) deployed in May 1965 and was the first major ground combat unit committed to Vietnam. During the first two years of the war, the brigade was involved in numerous offensive actions, most notable were the battles of Dak To and Junction City. The brigade most frequently deployed to conduct search and destroy operations or search, seize, and clear operations. Vietnam provided new and difficult challenges for the

173d, particularly in the realm of military intelligence. S. L. A. Marshall effectively synopsized the toughest of these--finding the enemy. "It is like hunting for a needle in a hay stack...one must have all of his sense and all of his people directed toward systemizing the search so that it will pay off."⁴⁰

To find his "needles", the battalion S-2s analyzed the enemy, weather and terrain, although in a less systematic fashion than today's IPB. Terrain analysis products were provided by the brigade S-2. For example, one such brigade terrain analysis product included trail overlays classifying the trails as "restricted" and "unrestricted". A second overly designated crossing sites over the Anloa River.⁴¹ Weather data comprised historical statistics which included average rain days, ceiling height, ground fog trends, and wind data. However, only limited analysis was provided discussing the operational impact of the weather on friendly or enemy operations.⁴² Aerial photography was available on some operations. For example, in support of Operation Cedar Falls, the brigade alone received 76 aerial reconnaissance missions.⁴³ Similarly, the battalions frequently conducted operations using special maps that consisted of a grid system and recent known or suspected enemy activity superimposed onto a photo mosaic reproduction. In some instances, MP's and engineers were employed to confirm the trafficability of planned deployment routes. More routinely, battalion commanders would personally conduct a helicopter reconnaissance prior to the operation in order to fill voids in the terrain analysis.

Frequently battalions were committed into a sector with little more than suspected, general enemy locations. This general information was developed routinely at division and higher levels by an analysis procedure known as pattern analysis. This precursor to IPB included the meticulous recording, plotting, and analysis of unusual indicators or recurring trends. The data analyzed included reports from aerial observations, sensors, patrols, and SIGINT assets; and activities such as changes river traffic, discovery of caches, increased enemy ambush activity and increased AA fires.⁴⁴ A former 173d Brigade Plans Officer indicated that the greatest single source of this general intelligence was intercept from Radio Research Units (RRU) attached to the brigade.⁴⁵ RRU was a shallow cover name for Army Security Agency forces operating Southeast Asia.

This pattern analysis technique was also used by some battalions to develop daily operations.⁴⁶ One of the most difficult aspects of using pattern analysis was the accurate estimation of enemy order of battle. Because of the nature of the low intensity battlefield, caution had to be exercised to preclude multiple counts of the same enemy elements, thereby overestimating the enemy strength.⁴⁷

Because of the limited amount of specific intelligence information available prior to the initiation of most operations, the 173d soldiers were sensitive to the need to report all information on enemy or suspected enemy activities. However, S-2s rarely identified priority intelligence requirements to focus

the effort. S. L. A. Marshall noted this shortcoming particularly in patrolling operations. He stated that there was a "vagueness on the part of many superiors in stating a patrol mission." Orders such as "check out an area" or "run a patrol" should be replaced with a clearly specific, purpose for that patrol.⁴⁸

Similarly, the formal reconnaissance and surveillance plan is a technique which was not used by the S-2s. The battalion's rudimentary collection plan was in most cases driven by the S-3. He normally tracked company locations and planned patrols on his situation map, thereby providing a graphic portrayal of the units surveillance coverage.⁴⁹

Even though they lacked formal collection plans, the battalions normally oriented their reconnaissance force forward. The scout platoons, called RECONDO by some battalions were employed, at times, in a traditional fashion such as leading a battalion movement to contact, or reconnoitering a battalion objective prior to attack. However, more often than not, they were reinforced and employed as a fourth maneuver element.⁵⁰ Thus, in close terrain when conducting offensive battalion operations such as a movement to contact or a search and destroy operation, the battalion's reconnaissance was provided essentially by a combined company effort. The level of decentralization of this reconnaissance effort varied based on the anticipated enemy threat, ranging from fire team to company size operations.

One asset which proved key to these battalion efforts to maximize the patrolling and reconnaissance capability of the

individual companies and platoons was the scout dog team.⁵¹ The allocation of teams, composed of one dog and a handler, varied from one to three attached teams per company. Normally, they were employed with reconnaissance patrols or moving with a recon squad leading a company or platoon movement.⁵²

Other reconnaissance assets used by the battalions of the 173rd included company size stay behind patrols, river patrols by 15 man pneumatic assault boats, and patrols from the South Vietnamese Regional Force/Popular Force (RF/PF) units. However, these were used much less frequently than the standard patrolling conducted by line units.

When employed defensively, primarily during night-time breaks in operations, companies would deploy listening posts/outposts (LP/OPS) 50 to 100 meters on their perimeter, usually one per platoon. The LP/OPS were usually employed on the main avenue of approach into the sector and in most cases afforded the LP/OPS the ability to run back to the perimeter of the main body.⁵³ Night patrols were rare and ground surveillance radars and sensors had not yet been fielded to the 173d. IR scopes and first generation starlight scopes were available. However, because of their weight and the limited acquisition range in jungle environment, they were normally relegated to base camp defense.⁵⁴

The combat information collected by battalion assets generally was transmitted rapidly up the chain to the battalion TOC. It flowed from the LP/OPS or platoon leaders to the company commanders and on to the battalion. Although generally good,

accuracy of this information varied. At times, the confusion and noise of battle, which Clausewitz describes as fog, caused the reports from junior leaders to be inaccurate or exaggerated. Communication links from the companies to the battalion were generally good. Both radio retransmission systems and airborne relay via helicopter or observation aircraft were used at times to ensure communications with the PRC-25 radio equipped companies.

Gaining and maintaining contact and retaining freedom to maneuver proved to be challenging. The enemy was elusive and frequently made contact at his own choosing and was often able to break contact and disappear from the battlefield.

Similarly, there were times when the hunter became the hunted.⁶⁵ In one such situation, A/2-505 Infantry unknowingly walked into a North Vietnamese Army (NVA) regiment conducting training. Decisive engagement followed. During the fire fight an NVA map, showing the regimental dispositions, was discovered and flown out on a medivac helicopter. Rapid processing of that combat intelligence revealed the extent of the contact and enabled A/2-505 Infantry to be rapidly reinforced.

The processing and dissemination of intelligence at the battalion level was fairly good. However, criticisms do exist that in some instances exaggerated or inaccurate combat information was disseminated without confirmation. Additionally, because most units, once deployed, developed the specific enemy situation, the volume of the information flow was generally greater going up the chain than coming down. In his primer on

Vietnam, S. L. A. Marshall noted that commanders and men who fought there, made the following observations about the intelligence flow:

1. It comes in greater volume than in any other war.
2. Not more than 10 to 15 percent of it leads to anything worthwhile though each lead must be followed to hit pay dirt.
3. Where there is a payoff in nine cases out of ten, the information which led to the introduction of tactical forces into a certain area proves to be wrong in whole or in part, and something quite else, but still worth the effort developed from the deployment.
4. Development and exploitation therefore depend chiefly on what the tactical unit learns and does.
5. Most of the intelligence which leads to worthwhile results in battle is collected by tactical units after they have deployed."

In this information rich environment a battalion could be intelligence poor unless it effectively exploited its organic collection and analysis capability.

The S-2s of the 173d were clearly challenged to produce intelligence in Vietnam where "timely intelligence information concerning the enemy was a rare and highly perishable" commodity.⁵⁷ Using basic terrain analysis, and in some instances pattern analysis, the battalions focused their reconnaissance and surveillance effort. The battalion's primary organic reconnaissance and surveillance asset proved to be infantry patrols, at times assisted by scout dog teams. Although their methodology was less structured than that of today's light battalion, the 173d proved capable of conducting reconnaissance and surveillance operations to effectively develop general intelligence into exploitable combat intelligence. This skill

assisted the battalions of the 173d Airborne Brigade (Separate) in gaining a reputation as one of the most elite fighting units in Vietnam.

82d AIRBORNE OPERATIONS IN GRENADA, '83

Another elite fighting unit, the 82d Airborne Division, tested its mettle in a short contingency operation in October 1983. As part of a joint task force, they were to assist in what was to be a surgical operation to: 1. protect and evacuate United States citizens and selected foreign nationals, 2. neutralize Cuban and Grenadian armed forces, 3. stabilize the country to assist in establishing a democratic government and, 4. to maintain peace.⁵³ The Grenada invasion commenced on 25 October at 0527 with an assault by the 2-75 Ranger Battalion on the point Salinas Airstrip.⁵⁴ Following the Ranger's partial seizure of the airstrip, the soldiers of the 82d began air landing and in conjunction with the Rangers secured the remainder of the airstrip. For the next three days fighting continued as soldiers of the 82d killed or captured Cuban soldiers, Cuban construction workers, and Peoples Revolutionary Army members, and secured American medical students. By 28 October, the build-up of 82d forces peaked at six battalions, all significant resistance terminated, and all key military objectives were achieved.⁵⁵

The focus of military operations then shifted to one of stability and pacification operations. Contact with enemy elements was very light. Battalions conducted extensive patrolling operations both in both city and jungle settings.

Their primary objectives were to round up sporadic, remaining Grenadian armed forces members and to locate caches of military equipment. By mid-November only one battalion of the 82d remained deployed on Grenada. It departed on 12 December leaving a multinational Caribbean Peace-keeping Force in country.⁵

Although the mission was short and the enemy was relatively unsophisticated, the battalions of the 82d Airborne Division did conduct reconnaissance and surveillance throughout both phases of the operation. The reconnaissance and surveillance effort began with IPB. Initial IPB, conducted prior to departing from Ft. Bragg, was less detailed than it doctrinally should have been. This most likely resulted for two reasons. First, the national intelligence which was needed to form the foundation for tactical analysis was woefully inadequate. Second, the "82nd was brought into the planning process very late..." thereby creating some confusion and uncertainty.⁶ Thus, the battalion S-2s were able to develop only a vague intelligence picture before departing. They estimated for example, that there were between four and twelve BTR-60's on the island; 18 were actually present.⁷ Additionally, estimates of the numbers and composition of Cuban, Peoples Revolutionary Army (PRA) and Peoples Revolutionary Militia (PRM) personnel were very soft. The anticipated 700-1,100 Cuban, 1,500 PRA, and 5,000 PRM personnel would turn out to be 43 Cuban Military Advisors, 636 Cuban construction workers, and only a few hundred PRA soldiers.⁸ Knowledge about the enemy's disposition and intentions was even more vague than that of his composition.

Would he fight? How hard would he resist? No one was sure.

Analysis of the terrain proved to be as limited as that of the enemy. Photos from national reconnaissance assets were provided to some, if not all battalion S-2s. However, these images of Point Salinas were of limited utility. In fact, upon reviewing these photos, which were provided without analysis, one company commander expected his initial objective area to be solid high ground. It turned out to be marshy.⁶⁵ Compounding a lack of detail about the terrain was the fundamental problem of inadequate maps. Because of their uncertain accuracy, tourist maps reduced the reliability of map derived IPB.

Once deployed, the S-2s began to build their data bases and IPB improved.⁶⁶ Maps were updated adding terrain changes such as newly plotted trails, villages, and LZs reported by the companies. Additionally, helicopter recon missions were conducted to identify and map potential LZs.⁶⁷ To improve the accuracy of reporting and overall utility, battalions superimposed their own reference index on these tourist maps. One battalion named this system, - "GRIPS"- - Grenada Reference Index Points. The limited number of enemy forces and their irregular nature precluded a classic Soviet threat-type templating of units. However, S-2s were able to make excellent use of human intelligence (HUMINT) and interrogation to develop the enemy situation by identifying specific individuals or facilities involved in Cuban or PRA activities. These named areas of interest could then be targeted for action or for ground reconnaissance to obtain additional information. One such

operation involved an airmobile raid by 2-325 Infantry on a suspected enemy training camp located in the mountainous center of the island. IPB on the target was better than for the previous three days of fighting but still lacked significant detail.⁶²

In addition to named areas of interest, battalions assisted in focusing their reconnaissance and surveillance efforts by designating PIRs and IRs. Brigades dictated some, while others were identified by the battalion commanders and their staffs, not always with S-2 involvement. Typical PIRs included: location of American citizens; location of weapons caches; location of any mortars or artillery; and location of key enemy leaders to include General Hudson Austin, Head of the Revolutionary Military Council and Chickenman one of Austin's Lieutenants.⁶³ These generally were updated as the operations changed.

Unlike the identification of PIRs, few battalions did formal reconnaissance and surveillance planning. Although the S-2s did not develop comprehensive overlays detailing the location and surveillance coverage of all surveillance assets, the S-3's operations maps were generally useful in managing the patrolling aspect of battalion's reconnaissance and surveillance effort. The S-3s plotted company zones, battalion controlled patrols, and company LP/OPs.⁶⁴

In an effort to find sparse enemy elements, battalions conducted extensive patrolling. Most were conducted by companies in zone. In some instances the scout platoons performed as additional combat elements, particularly during the first day of

hostilities. However, most frequently, when the battalions conducted saturation patrolling, the scouts received a separate patrol sector similar to the line companies. Patrols varied in size based on the likely threat. Early in the operation, units moved as companies and by the end of the deployment, companies were conducting up to 9-12 individual patrols.⁷¹ Much of the intelligence gathered by these patrols, especially when operating in the towns, was HUMINT information volunteered by anti-PRA Grenadians. Additionally, the battalions received periodic in-flight reports from Army helicopters operating in their sectors which complemented information received from patrols.

At night the reconnaissance and surveillance effort became much more passive. With rare exception, units did not patrol after darkness. Units secured themselves in company perimeters posting either LP/OPs or ambush positions. Usually one, three man LP/OP was posted per platoon. Equipped with Dragoon thermal sites, these positions were wired into the company CP. Some battalions augmented their organic surveillance capability with in-flight reports from A/C-130 Specter Gun Ships. These aircraft were on station almost continually from 2200 to 0600 and would respond to requests for suspected target identification with a detailed description of the unidentified activity.⁷²

During the day, patrols oriented on reconnaissance objectives which for the most part were tied closely to the battalion's identified PIRs. Information reported from these patrols was generally good. However, the quality of spot reports,

improved as the operation progressed. At times, communications became difficult, especially in the rugged terrain in the center of the island where communication dead space existed. Radio retransmission assets located on high ground such as Mount St. Catherine and occasional OH-58 relays provided the means to overcome the communication shortfalls.

Generally, information developed by the battalion's reconnaissance and surveillance efforts was processed efficiently and disseminated rapidly. For example, A/3-325 Infantry captured a chart detailing enemy air defense artillery positions on the island. Within a matter of hours, the information reached the Joint Task Force Commander, resulting in immediate cessation of all air activity over Grenada until the validity of the information could be determined.⁷³

Reconnaissance and surveillance operations in Grenada were a key component of battalion operations, particularly in the stability and pacification phase. Because of the initially sparse enemy and terrain data base, early IPB was limited but later expanded as operations produced more combat information. Nonetheless, the process was not as systematic as it should have been. IPB, in conjunction with PIRs, did help to focus the battalion's reconnaissance and surveillance efforts. However, in most cases the reconnaissance and surveillance effort was not tightly controlled by the S-2. Throughout the operation, the battalion's mainstay collection asset proved to be the infantry patrol. Although less formalized and less systematic than it

might have been, the battalions of the 82d relied on their reconnaissance to locate their often elusive enemy.

The experiences of the 82d Airborne Division in Grenada and the 173d Infantry Brigade (Separate) in Vietnam yield three common reconnaissance and surveillance themes. First, whether it is called pattern analysis or IPB, a procedure to systematically analyze the enemy, weather, and terrain is critical to the effective employment of a unit's reconnaissance and surveillance assets. Second, infantry reconnaissance patrols, whether from the scout platoon or line companies, can generate a massive amount of combat information. They remain the most plentiful and reliable organic light infantry battalion recon tool. Lastly, a battalion must generate the bulk of its own operational intelligence. The brigade and the division will generally provide broad intelligence. But, to develop this broad intelligence picture with sufficient resolution for battalion operations, intelligence must be refined by conducting effective battalion reconnaissance and surveillance operations.

CURRENT BATTALION RECONNAISSANCE AND SURVEILLANCE

"You can never have too much reconnaissance."

George S. Patton, Jr."

Like the battalions of the 173d Airborne Brigade (Separate) in Vietnam and the 82d Airborne Division in Grenada, today's light infantry battalions rely on effective reconnaissance and surveillance for a large portion of their intelligence. The unforgiving JRTC environment provides today's light infantry units

the opportunity to test their intelligence systems. In large measure, the challenges and shortcomings explored in the remainder of this paper are more apparent than those in the Vietnam and Grenada sections. This hypercritical perspective results from the nature of the JRTC environment where, unlike combat, every facet of a unit's performance is monitored by observer/controllers and recorded in take home packages (THP). The following section is based primarily on such JRTC derived observations of light infantry battalions exercising at Ft Chaffee, Arkansas.

Before analyzing how the light battalions presently conduct reconnaissance and surveillance we will first examine the resources that they have available to conduct these missions. Organic assets include the scout platoon and infantry company patrols, LP/OPs. Complementing these collectors, are attached combat support elements which frequently include a ground surveillance radar (GSR) team, a remotely monitored battlefield sensor system (REMBASS) team, an engineer platoon, an ADA section, and battalion fire support teams. Additionally, some light units presently possess the Pointer system, an experimental short range, Very Low Cost Unmanned Aerial Vehicle (VLC UAV).⁷⁵ (See appendix B. for Pointer system characteristics)

The scout platoon, "the eyes and ears of the battalion commander is a light 19 man force comprised of a headquarters and three, five man squads."⁷⁶ Because of its foot mobility, the platoon's capabilities are optimized when it is employed on anticipated enemy avenues of approach or on battalion objective

areas. The platoon doctrinally operates "two to eight kilometers from the battalion".⁷⁷ Similarly, its limited firepower and lack of crew served weapons dictate that it must obtain its information by operating stealthfully, vice fighting for it. Nine organic PVS-2 night vision sites provide night surveillance capability. It normally reports on the battalion command or battalion operations and intelligence net, via the squad PRC-77s. Range is highly terrain dependent but varies from five to eight kilometers with whip antenna up to 25 kilometers with a field expedient directional antenna.⁷⁸

Complementing the scout platoon, light infantry companies dispatch patrols or employ LP/OPs patrols and frequently conduct reconnaissance from the line of departure to assault positions vicinity of the objective, where they often link up with the battalion scouts. In the defense, LP/OPs are posted along the most dangerous avenues of approach into the company sector. When attached, the battalion's collection is enhanced further by assets from the division's military intelligence (MI) battalion. One or two AN/PPS-15 ground surveillance radar GSR teams may be attached. These provide line of sight detection for personnel targets to 1,500 meters and vehicular targets to 3,000 meters. To identify specific target types, GSRs employment is optimized in conjunction with NODs.

Similarly, remotely monitored battlefield sensor system (REMBASS) teams from the MI Battalion may be attached to the task force or to the brigade. Even when attached to the brigade, they

can provide real time read out to the task force. Hand emplaced sensors strings positioned along anticipated enemy avenues can provide early warning with three sensor types: magnetic, seismic/acoustic, and infrared. Detection ranges vary from 3 to 350 meters.³

Optimally employed, the REMBASS sensor strings are arrayed with a mix of complementary sensors to provided the most precise target identification possible.⁶⁰ When activated, the sensors transmit up to 15 kilometers which can be extended an additional 15 kilometers using a repeater.

Coordinating this diverse and complex array of reconnaissance and surveillance assets is the battalion S-2. In addition to these assets, the S-2 can coordinate with the S-3 to task attached or direct support elements, whose primary missions are other than intelligence, to assist in the collection effort. These include engineer, air defense, and aviation assets. The S-2 can also coordinate with the fire support officer for the battalion's three fire support teams (FIST) to provide reports via their forward observers or forward observation lacing teams. By virtue of their training in target location and identification, as well as their GVS-5 laser range finders, FIST personnel are especially capable of providing accurate reports. Similarly, engineers, when available, can be incorporated into the scout platoon or into company reconnaissance patrols. Their expertise can be particularly useful when conducting route reconnaissance to increase the quality of reporting on obstacles and trafficability.

Short-range air defense elements can provide surveillance and early warning of enemy threat aircraft. Additionally, they can assist the S-2 in developing the air IPB. Lastly, both Army and Air Force aviation operating in the light infantry battalion's area of interest can be queried to provide real time, in flight reports.

Having this host of potential reconnaissance and surveillance collectors available to the commander does not guarantee a clear view of the battlefield. The S-2 must appropriately manage these resources and insure that combat information is rapidly reported, processed, and disseminated.

The cornerstone of a good reconnaissance and surveillance effort is solid intelligence preparation of the battlefield. This enables the light infantry battalion to focus its finite collection resources on the most lucrative, anticipated areas or targets. Emphasizing the significance of IPB, a division commander recently stated that "one of the most important tasks for leaders included preparing a good intelligence preparation of the battlefield."⁸¹

In spite of the criticality of IPB, problems exist in its execution. Most terrain analysis is conducted using 1:50,000 maps. These generally provide sufficient detail for the area of interest but may not have the detail required for the area of operations, particularly of the objective area. Compounding this problem of insufficient map resolution is a reluctance or oversight on the part of many S-2s to employ scouts and engineers

to recon critical areas to acquire missing key terrain information, necessary for a thorough IPB. Such oversights in turn result in an IPB with insufficient detail to accurately base mission planning.

Similarly, some recurring shortfalls exist with regard to the threat analysis and integration. To develop accurate templates, the S-2 must have a sound technical knowledge of the enemy. Yet, like the S-2s in Grenada, many lack an in-depth of knowledge of non-Soviet enemy doctrines. This shortfall is critical because non-Soviet forces are the units light divisions will most likely be deployed against.⁸² Lacking this technical knowledge, some S-2s have difficulty developing effective event templates, which in turn results in incorrectly chosen NAIs and misdirected reconnaissance.

Even more fundamental to the IPB process than these shortfalls on the resolution of terrain and threat analysis is commander and staff involvement. Nonetheless, a commonly noted JRTC problem is the lack of staff integration in the IPB process. IPB must be an integrated staff planning effort. This is particularly critical with an inexperienced S-2 who does not fully understand the needs of the supported commanders.⁸³ The commanders and the staffs tend to view the process as a purely S-2 task. By failing to identify their intelligence requirements to the S-2, the intelligence officer is unable to tailor the IPB to answer the specific needs of the supported commanders and staff.

A composite of the problems listed above is vague intelligence estimates. This shortcoming is common to at least one third of the light infantry battalions training at JRTC, and as we noted earlier was characteristic of both Vietnam and Grenada IPB.⁸⁴ A JRTC paper notes,

The estimates which are produced are generally accurate in their depiction of what the opposing commander is trying to do. However, the estimates never provide the detail the commanders really need to focus their efforts. A typical estimate will place an enemy company operating in a particular area. That estimate will not indicate where that commander is placing his platoon and what missions they are given, where the most likely locations for the C2 element is, where the supply routes or key nodes (LZs, caches, etc.) are, or even what terrain or other area features are key to the enemy commander's mission. This problem is the same at every echelon.⁸⁵

When IPB is done in partial or total isolation from the rest of the staff, it does not provide the foundation for the OPLAN as doctrine requires.

Even when detailed IPB is developed in conjunction with the commander and staff, it frequently is not kept continuously updated throughout the operation. When this occurs, the S-2 can not maximize the unit's reconnaissance and surveillance resources to support the commander's intent. JRTC observer controllers note that this is exacerbated by a staff isolation which tends to set in after the first 48 hours. The focus on the current battle, combined with fatigue and stress reduces staff integration. As the commander and the S-3 begin doing more in isolation, the staff is less able to assist because they lose their vision of what the commander wants.⁸⁶

Finally, the IPB process is frequently flawed because the

S-2 is often the only individual with a complete understanding of the process and the products. Additionally, he often fails to develop precise IPB graphics. This creates difficulty in 24 hour operations and increases the complexity of the BICC or S-2 NCOIC in updating the IPB and in managing the reconnaissance and surveillance effort.

Without accurate IPB, management of the light infantry battalion's reconnaissance and surveillance effort will be ineffective. Frequently cited short comings include insufficient staff integration, inadequate detail and failure to keep it updated. For these reasons and its recognized criticality, IPB continues to an area identified by many JRTC experienced battalion commanders as a "most important" task for senior leaders to train their units on.⁸⁷

Like IPB, the commander must also be involved in the identification of priority intelligence requirements. These are essential to focus the battalion's reconnaissance and surveillance assets. JRTC experience has shown that although PIRs and IRs are identified, routine shortcomings exist in the process. At JRTC, 25% of units have PIRs that do not relate to the tactical plan, while 33% of units identify PIRs that do not address the commander's expressed priorities.⁸⁸ Similarly, some units fail to prioritize their PIRs, fail to concentrate them on the battalion's main effort, and forget to update them as the mission progresses. Key to avoiding many of these problems is ensuring that the commander, not just the S-2, is involved in this process. When

the commander is not closely tied in, valuable collection assets may be wasted against targets that do not provide information critical to the operation. Selection of PIRs is at the heart of a unit's reconnaissance and surveillance plan, and as such is too critical for the commander to delegate.

Once the S-2 develops his IPB, which yields NAIs, and identifies the commander's PIRs, he is ready to formulate a reconnaissance and surveillance plan. The complexity of synchronizing the employment of a limited number of surveillance assets against the high payoff targets, at the critical times, mandates the use of a reconnaissance and surveillance plan. The importance of this plan is underscored by a JRTC observer who notes that "a direct correlation between the Task Force's defeats and lack of intelligence based on a well thought out reconnaissance and surveillance plan clearly existed."⁴⁹

In spite of the acknowledged importance of the reconnaissance and surveillance plan, light infantry battalions continue to experience problems planning and managing their reconnaissance and surveillance effort. Fundamental to this planning process is a clear understanding by the S-2 of the assets available to the battalion-to include higher, lower, and attached. S-2s frequently do not understand the capabilities and limitations of these resources, particularly GSRs and REMBASS. Thus, they are unable to maximize the battalion's collection potential and under employ systems.

Another recurring planning problem is failing to use

established PIRs, IRs, and NAIs as the foundation for the reconnaissance and surveillance plan. The plan should focus on the NAIs and should attempt to provide answers to the commander and staff's PIRs and IRs. When reconnaissance and surveillance requirements are not prioritized and linked tightly to the commander's PIRs, information gathering often is wasted on low priority areas, resulting in inadequate coverage of more critical areas. This difficulty is experienced by 50% of the battalions at the JRTC who fail to allocate sufficient resources to obtain needed information.⁹⁰

Even when the initial reconnaissance and surveillance plan does sufficiently resource the PIRs and NAIs, it frequently is not updated as the situation changes. This results in valuable reconnaissance assets being squandered looking for activity in the wrong area. Or it may cause last minute reactive employment of reconnaissance and surveillance systems, forcing them to give up surveillance time for movement time as they attempt to reposition to an adjusted area of interest.

One of the most fundamental difficulties in executing the plan often stems from failure to synchronize it with the S-3 and other staff officers. This can result in potential fratricide situations as reconnaissance and surveillance systems operate independently throughout the battalion sector. It also can cause missed collection opportunities because potential assets are often not tasked. In one such case noted by a JRTC observer controller, "critical information could have been gathered by company patrols

had the companies sent them where the S-2 knew someone should look."³

Even when sufficient assets are employed, some S-2s do not effectively focus them. What is often missing is the development of specific information requirements which will answer the commander's PIRs. Even when this is done, reconnaissance and surveillance assets do not always receive individual taskings from the S-2, who directly targets their systems on the identified specific information requirements. Asset tasking can be refined further by providing the collectors with an IPB briefing so that they better understand why they are been tasked to acquire specific information and how best to acquire it. This briefing is routinely not done well, if done at all.³² Such a briefing is especially important for attached reconnaissance and surveillance assets and the scout platoon for "...IPB is the scouts road map to detecting enemy strengths and weaknesses."³³

The reconnaissance and surveillance plan and its effective management are critical elements in maximizing the light infantry battalion's ability to see the battlefield. But in spite of its importance, it is frequently not developed and managed effectively. The most prevalent shortcomings include incomplete understanding of asset capabilities, failure to focus on NAIs and PIRs, and insufficient updating and synchronization of the plan.

Even with a solid reconnaissance and surveillance plan, challenges exist in employing assets in accordance with the reconnaissance fundamentals outlined at appendix 1. Most light

infantry battalions generally attempt to doctrinally employ maximum reconnaissance forward. To optimize their reconnaissance, the scout platoon with its limited size and mobility, must normally be employed well forward. However, with only three scout squads, the platoon may be augmented by infantry squads from a line company to increase its coverage. Another technique often used is to focus the scout platoon deep on the battalion's objective while company patrols are targeted on close NAIs and routes. In spite of a general trend to maximize reconnaissance forward, problems remain with some units under-employing their valuable and limited scouts. JRTC observers continue to note such malutilization as employing scouts for HHC details, mine clearing missions, blocking position roles, and various combat missions.³⁴ This combat role parallels the 173d's frequent use of their scout platoons as maneuver elements. An associated problem which can prevent maximum reconnaissance forward is a tendency by some battalions to deploy the scouts late or to give them insufficient time to effectively complete their mission.³⁵

Similarly, REMBASS employment generally does not optimize the systems capability. The trend is frequently to deploy them too close to the FLOT. This fails to maximize early warning time available for the commander to exploit the threat situation.

Even when reconnaissance is forward deployed, some light infantry battalions only orient their assets with general objectives. In one such unfocused reconnaissance operation, because of their lack of precise orientation, a unit's patrols

were described as more closely resembling a "terrain walk than ... recon patrols".⁹⁶ The most common employment issues stem from difficulties in rapid, accurate information reporting. Although "reporting is foundational to the intelligence system", spot reports are often incomplete and frequently go unchallenged by the receiving headquarters.⁹⁷ In some cases, requests for missing size, activity, location, unit, time and equipment (SALUTE) data by the tactical operation center would have yielded answers to the commander's PIR. Emphasizing the significance of this shortfall, one JRTC observer controller stated that, "Reporting remains a critical weakness in the battalion intelligence system."⁹⁸

Communication challenges, particularly for the scout platoon, further complicate the reporting process. The limited range of the PRC-77 often requires the use of field expedient directional antennas or relay via another platoon element or an adjacent unit. Proficiency at such extended communication techniques varies. Poor scout platoon communications frequently reduce the flow of critical information to the battalion commander. This equipment problem is highlighted by a recent scout platoon leader survey in which 75% of the respondents believed that the platoon's communication equipment was inadequate to conduct effective reconnaissance.⁹⁹ Increased radio range, not numbers of radios, is the issue. Complementing this belief a JRTC observer controller stated, "Battalion Scouts need adequate communication equipment...FM radios are inadequate..."¹⁰⁰

Timely accurate information flow from the companies to the

Tribute to this, a recent survey indicated that the commanders believe their scout platoons normally find 66% of the enemy.¹⁰³

Conversely, the demonstrated ability of the attached GSR teams, to gain and maintain contact with the enemy is less encouraging. One half of the light infantry battalions experience problems employing their GSRs.¹⁰⁴ And the THPs note many such shortcomings due to poor camouflage, imprecise land navigation, faulty leadership, and inadequate collection tasking.¹⁰⁵ These all reduce their ability to gain and maintain contact with the enemy.

Current trends in asset employment reveal that task forces are not maximizing the capability of their reconnaissance and surveillance systems to see the enemy. Most significantly, assets need to be more precisely oriented on critical recon objectives, S-2s must understand and fully exploit the capability of all task force R&S assets, and reporting timeliness and accuracy must be increased.

As Guderian noted, the processing and dissemination of this combat information must be accurate and rapid if it is to be of any utility to the commander. The quality of analysis varies. It appears, in large measure, to be directly related to the quality of the personnel staffing the light infantry battalion's S-2 section. In some cases so much of the analysis is personally done by the S-2 officer that when he is gone the effort virtually stops.¹⁰⁶ Similarly, when the S-2 section begins to tire from the strain of rigorous 24 hour operations, the quality of analysis often declines. This degradation can be reduced by a strictly

enforced sleep plan, but some units do not have or can not implement such a plan.

The most common criticism of the S-2's analysis is a tendency to accept combat information provided by reconnaissance and surveillance assets at face value, rather than attempting to confirm or deny it.¹⁰⁷ Thus, unanalyzed and possibly incorrect, information is passed on by the S-2 and viewed by the receiving units as substantiated intelligence. Other less frequently noted shortcomings in the analysis process include insufficient detail and failure to update enemy order of battle data bases.¹⁰⁸

Lastly, the manning of the S-2 section often has an impact on the level of analysis and efficiency of the dissemination. Although the billet authorizes an MI captain, 87% are filled by lieutenants.¹⁰⁹ For the most part these "young, aggressive, but inexperienced officers" have an insufficient "understanding of reconnaissance skills, staff estimates and tactical requirements."¹¹⁰ Compounding the S-2 officer's inherent professional immaturity, the remainder of the section is often undermanned and staffed by inexperienced personnel.¹¹¹ Thus, insuring the proper staffing of his S-2 section is one of the most significant contributions a commander can make to maximize his battalion's reconnaissance and surveillance effort. A foundational requirement to the commander's ability to "see the battlefield" is a proficient S-2 section.

CONCLUSIONS

When the light task force commander doctrinally employs all

of his assets, he has the ability to effectively recon and surveil the battlefield. However, to accomplish this, the S-2 must develop a sound, IPB based collection plan, all reconnaissance and surveillance assets must be employed to their maximum potential, and reports must be timely and accurate. Today, gaps exist between the reconnaissance and surveillance coverage a task force commander can have and what he routinely gets. Let's review "why?".

The intelligence preparation of the battlefield is the cornerstone of effective reconnaissance and surveillance. The process is sound but the execution is poor. Generally, it is not developed in an integrated staff effort and commanders are not sufficiently involved. The XO, in his chief of staff role, should more aggressively facilitate this process.

Once developed, the IPB, along with the commander's PIRs, must focus the reconnaissance and surveillance effort. Many light infantry battalions are failing to sufficiently identify these areas of concentration. Thus they squander finite assets looking at nonessential targets.

Employment of the R&S assets must be directed by a comprehensive reconnaissance and surveillance plan. These plans often do not maximize the synergistic capability of the many available reconnaissance and surveillance assets. Lastly, the S-2 must be more aggressive in the management of his reconnaissance and surveillance plan. The scout platoons are habitually over tasked while other assets are routinely under-

utilized.

Difficulties also exist in employing assets. The biggest such shortcoming remains timely accurate reporting. "80% of battalions training at the JRTC, experience problems in this area."¹²

Difficulties include both insufficient range of the scout platoon's radios and failure to report using the SALUTE format. Without timely, accurate combat information the frequently undermanned and inexperienced S-2 section will be challenged to effectively process and disseminate useful intelligence.

IMPLICATIONS

The officer personnel distribution for military intelligence captains is unlikely to change in the foreseeable future. Thus, most light infantry battalion S-2s will continue to be lieutenants. This places increased responsibility on, battalion S-3s, XO's, battalion commanders, brigade S-2s, and division G-2s to better develop the skills of these young officers in the field. To do this, their IPB education must be very sound. IPB curriculum at the Intelligence Officer Advanced Course, Command and General Staff College, and Precommand Course should be reviewed to insure that it will adequately prepare them for this role.

Similarly, more task force training is needed with slice elements such as REMEASS and GSR teams. Frequent training will increase the understanding of these system's capabilities and limitations to enhance the battalion reconnaissance and surveillance effort.

Communications improvements are also necessary to enable the S-2 to receive more timely accurate information. The organic scout platoon radio needs addition range. This would preclude the patrols from having to stop and erect directional antennas ,at times, to report. Additionally, proper SALUTE reporting must be stressed. Increased SALUTE report training, combined with strict net control station discipline, will yield more detailed, accurate and useful combat information.

Lastly, even if all facets of the light task force reconnaissance and surveillance system are operating perfectly, the commander's reaction time to adjust coverage remains tied to foot mobile soldiers. The enemy will not always oblige and orient himself as doctrinally anticipated. Thus, in order to prevent surprise, the commander needs more flexibility to rapidly reorient his reconnaissance and surveillance assets. Similarly, he must be able to surveil more than just the most likely NAIs. The addition of motorcycles to the scout platoon TOE would provide enhanced mobility giving the commander increased reconnaissance and surveillance flexibility. Furthermore, the addition of a VLC UAV system such as the Pointer, to the surveillance company of the light military intelligence battalion or to the light infantry battalion would provide the commander with a quick reaction, wide area coverage system. At key times, one such system could potentially produce more combat information than the rest of the battalions reconnaissance and surveillance effort combined.

As General Wickham stated, the light infantry... "will take

maximum advantage of... high technology concepts..."¹¹³ These are two excellent examples of how currently available technology can enhance the R&S capability of the light battalion.

From Sun Tzu to the present, enlightened military men have recognized that reconnaissance and surveillance is a critical factor in battlefield success. The process has evolved to become more doctrinally systematic than in the past. But, even with the addition of IPB and sophisticated reconnaissance and surveillance equipment, the commander's challenge remains the same. He continues to collect and analyze information, to preclude surprise and focus his combat power. Like Jomini, his theoretical objective continues to be the attainment of "perfect information."

APPENDIX A: CRITERIA AND DOCTRINAL REFERENCES

CRITERIA	REFERENCE
1. THOROUGH IPB	FM 34-130 <u>Intelligence Preparation at the Battlefield</u> , May 1989.
A. Synchronized Staff Effort.	pp. 3-1 to 3-3, 5-2 to 5-3.
B. Sufficient terrain information.	p. 4-6.
C. Accurately evaluated weather and terrain.	p. 4-6 to 4-42.
D. An accurately evaluated enemy.	p. 4-6 to 4-66.
E. Continuously updated.	p. 4-1.
2. APPROPRIATE PIR	FM 34-3 <u>Intelligence Analysis</u> , March 1990.
A. Reflects commander's priorities.	p. 2-2.
B. Continuously updated.	p. 2-2.
3. COMPREHENSIVE RECONNAISSANCE AND SURVEILLANCE PLAN	FM 34-80 <u>Reconnaissance and Surveillance</u> , October 1990.
A. Includes all organic assets.	p. 2-22 to 2-23.
B. Focused using IPB and PIRs.	pp. 2-23 to 2-25.
C. Continuously updated.	TC 30-35 <u>Tactical Surveillance Officer</u> , June 1977. p. 33.
4. ASSETS EMPLOYED IN ACCORDANCE WITH RECONNAISSANCE FUNDAMENTALS	FM 17-98 <u>Scout Platoon</u> , October 1987.
A. Maximum reconnaissance forward.	p. 3-2.
B. Orient on reconnaissance objective.	p. 3-2.

- C. Report all information accurately. p. 3-2.
- D. Retain freedom to maneuver. p. 3-3.
- E. Gain and maintain enemy contact. p. 3-3.
- 5. EFFICIENT PROCESSING AND DISSEMINATION OF COLLECTIVE INFORMATION FM 34-3, Intelligence Analysis, March 1990
 - A. Information evaluated for pertinence, reliability and accuracy. p. 2-4.
 - B. Sound deductions drawn. p. 2-18.
 - C. Critical information passed quickly. p. 2-18.

APPENDIX B: POINTER UAV PERFORMANCE CHARACTERISTICS

CHARACTERISTICS	DESCRIPTION
AIR VEHICLE	
Wingspan	2.7 m (9 ft)
Length	1.8 m (6 ft)
Weight	4 kg (9 lbs)
Structure	Modular, KEVLAR Composite Airframe
PERFORMANCE	
Duration	1 hour plus
Airspeed	36-72 kph (22-45 mph)
Patrol Radius	5.6 km (3.5 miles)
Climb Rate	100 m/min (600 ft/min)
Nominal Low Altitude	30 m (100 ft)
Launch Method	Hand Launch
Recovery Method	Autoland by Deep Stall
SUBSYSTEMS	
Power	Li-SO2 Battery (1+ Hr Duration) or Ni-Cad Battery (Rechargeable, 10 Min Duration for Training Flights)
Propulsion	300-Watt Samarium Cobalt Motor
Gearing	Gear Reduction
Propeller	Folding, Pusher Propeller
Stabilization	Self-stabilizing with gyroscopic stability augmentation system
Video Camera	CCD, 350 lines vertical resolution & 380 lines horizontal; 22 deg. & 30 deg. view angles
Navigation	Electronic compass heading sensor; VFR Dead Reckoning
Aircraft Backpack Size	0.9 x 0.45 x 0.3 m (3 x 1.5 x 1 ft); 20 kg (45 lbs)
Ground Station Backpack Size	0.6 x 0.3 x 0.25 m (2 x 1 x 0.8 ft); 23 kg (50 lbs)
Links	Radio Frequency or Fiber-Optic
ASSEMBLY TIME	
Airframe (no instruction)	2.5 minutes
Airframe (after practice)	1.5 minutes
GCS (no instruction)	4 minutes
GCS (after practice)	1.5 minutes
GROUND CONTROL STATION (GCS)	
Data Display	2 Shrouded Monitors; Monochrome; 4-inch, 380 Lines; Video Images & Aircraft Heading Display
Recorder	8 mm Video Cassette; Replay with Freeze Frame, Fast & Slow Motion; Stereo Audio Channels; Replays Aircraft Heading
Receiver Output	Two Video & Two Audio Channels

Chart from a reprint of Robert Finkelstein, "Pointer: A Backpackable RPV", Unmanned Systems Magazine, (Spring 1989), p. Unlisted.

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18. Ibid., p. 245.
19. Ibid.
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21. Ibid.
22. Ibid.
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48. Marshall, p. 23.
49. Interview with COL (RET) Donald Phillips, former BN S-2 and BN S-3 with the 173d from 1966 to 1967.
50. Smith interview.
51. Moving at the point, scout dogs greatly enhanced the detection range of enemy personnel. Ranges varied with the weather, but were up to 30 yards. Upon smelling or seeing the enemy, the dogs would alert silently. On the whole, the dog teams were superb in identifying Viet Cong positions. A former company commander who operated with three attached teams, said emphatically, "I loved them." On operation Niagara/Cedar Falls, the Brigade's 12 dog teams provided this enhanced reconnaissance capability on over 80 patrols.
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52. Smith Interview.
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55. Garland, p. 131.
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58. Maj Mark Adkin, Urgent Fury, (Lexington MA: Lexington Books, 1989), pp. 217-224. and interview with MAJ Gordan C. Bonham, former A/S-3 with the 82d in Grenada.
59. Richard A. Gabriel, Military Incompetence, (New York, NY: Hill & Wang), p. 163.
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75. The 7th ID (L) and the 2d ID (M) have tested the pointer. Presently, the 82d ABN and the 25th ID (L) are testing systems. Four days before deploying to Saudi Arabia, the CG of the 82d said, "if we were to go to war today - the Pointer will go with the Division." Today the pointer is supporting them on Operation Desert Shield.

For purposes of evaluation, the Pointers have been given to the MI battalions to operate. However, the operational concept behind the system, if procured, is to add it to the brigade or battalion TOE as an organic collection system. Because of its relative ease of operation, it will not require the additional personnel in the TOE.

The Pointer system contains one ground control station (GCS) and four aircraft. Virtually silent, radar transparent, and invisible to the naked eye at distances over two kilometers, the battery powered aircraft can conduct surveillance missions of up to one hour to a range of five kilometers. Real time down link provides immediate combat information to the GCS and to the video tape recorder for subsequent playback and re-evaluation. The black and white, day light camera provides good resolution. Operating at 250 feet on AGL on a recent FTX, resolution was sufficient to recognize insignia on soldiers helmets. Though not without shortcomings, the Pointer is generally well liked by the units that are evaluating it. It provides responsive short range observation in the light infantry battalion commander's area of interest.

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93. LTC Donald E. Vandergriff, "Scout Platoon, Offensive Reconnaissance," Infantry, (September-October 1988), p. 16.

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